Space Weather Forecast

Issued on Monday, 01 May 2023 at 13:06 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of R1 Minor - R2 Moderate radio blackouts throughout.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Moderate with one Moderate flare occurring 30/2028 UTC from a new region recently rotated over the northeast limb. There are five sunspot regions, with the largest in the southwest quadrant consisting of a number of mature spots but with some clear instability evident in its magnetic structure. This has been the source of a few Common-class flares. The most active region is the group that recently rotated over the northeast limb with frequent low to mid-level Common-class flares as well as the aforementioned Moderate class flare. Another small and compact sunspot region, just east of the north-centre disc, is also of note, although this has been simplifying. The other regions are smaller and simple. There are also a number of potentially eruptive filaments - or lines of plasma that form due to the Sun's magnetic field - on the Earth-facing disc. Despite this no new Earth-directed CMEs (coronal mass ejections) were observed.

Solar Wind / Geomagnetic Activity: The solar wind was generally reflective of a waning coronal hole fast wind. The wind speed started the period at elevated levels, around 500-550 km/s, but eased to elevated at around 470 km/s. A more recent slight enhancement to 500-560km/s may be potentially linked to a coronal hole fast wind from the northwest quadrant. The Interplanetary Magnetic Field was weak, with the north-south component also only varying weakly. Geomagnetic activity was Quiet to Unsettled (Kp 1-3).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) was at background with no solar radiation storms observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Low to Moderate activity is expected with a chance of further Moderate flares.

Solar Wind / Geomagnetic Activity: There are several CMEs which are expected to largely miss Earth in the coming days, however some glancing influences cannot be ruled out. The most likely candidate CME to affect Earth left the Sun on the 29 Apr and is expected to pass by late on day 2 or early day 3 (02 or 03 May). Otherwise current fast wind conditions are expected to gradually ease, although some peripheral enhancement is also possible from another coronal hole fast wind through days 1 and 2 (01 and 02 May). Geomagnetic activity is expected to be Quiet to Unsettled, but with ongoing chance of Active intervals, mainly late day 2 or early day 3 and a slight chance of G1 Minor Storm intervals.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is expected to be at background with no solar radiation storms occurring. However count rates may increase with any significant flares that occur, mainly from the southwest or northern central sunspots, with a very slight chance of reaching the S1 Minor Radiation Storm threshold.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	5	15	15	5
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	55	50	40	40
Very Active	R3 to R5 X	No	5	5	5	5

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	5	5	5	5
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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